

Subatomic Particles

Octet Rule

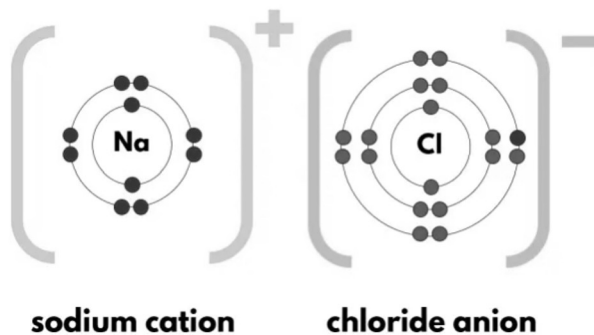
Atoms are the most stable when they have 0 or 8 valence electrons.

Ion – Atom that has lost or gained e^- to fulfil the octet rule

Sodium (Na)
loses $1e^-$ to
form a **cation**

$1 \text{ val } e^- \rightarrow$
 $0 \text{ val } e^-$

Cation = + Ion



Chlorine (Cl)
gains $1e^-$ to
form an **anion**

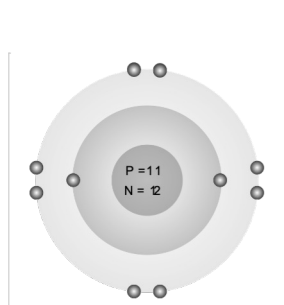
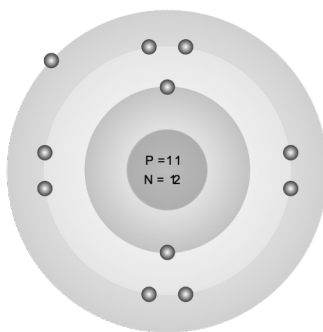
$7 \text{ val } e^- \rightarrow$
 $8 \text{ val } e^-$

Anion = - Ion

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Subatomic Particles

Charges of Ions– Cations (Lose e^-)



Neutral Atom

Sodium (*Metal*)
 $11p^+ + 11e^- = 0$
No Charge - Neutral

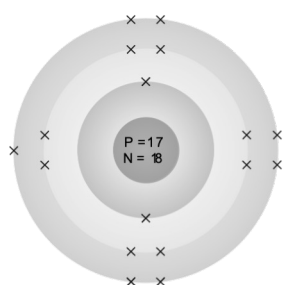
Cation (Lose $1e^-$)

Sodium Ion (*Cation*)
 $11p^+ + 10e^- = +1$
+1 Charge - Cation

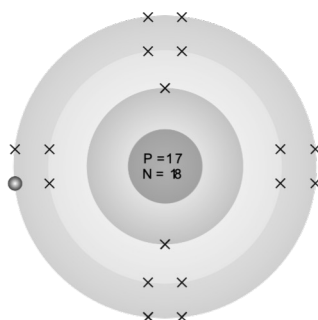
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Subatomic Particles

Charges of Ions– Anions (Gain e^-)



Cl Atom



Cl⁻ Ion

Neutral Atom

Chlorine (*non-metal*)

$$17p^+ + 17e^- = 0$$

No Charge - Neutral

Cation (*gain $1e^-$*)

Chlorine Ion (*anion*)

$$17p^+ + 18e^- = -1$$

-1 Charge - Anion

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Subatomic Particles

Ion Charge

Charge of an ion is based on the group on the periodic table

Cation (+ ion): Ions formed due to gaining electrons (*metals*)

Anion (- ion): Ions formed due to losing electrons (*non-metals*)

Group	Val e^-	Charge	Group	Val e^-	Charge	Group	Val e^-	Charge
1A (1)	1	1+	3A (13)	3	3+	6A (16)	6	2-
2A (2)	2	2+	4A (14)	4	4+ / 4-	7A (17)	7	1-
1B – 10B (3 – 12)	2 (Varies)	Varies	5A (15)	5	3-	8A (18)	8	No Charge

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